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E02D 29/14

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GB 2124683 A GB 0336437 A

(58) Field of Search
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(54) Cover and frame assembly

(57) A cover and frame assembly comprises a frame 10 adapted to be received in the ground, and a cover 39 engageable with the frame to selectively prevent or allow access to an opening beneath the frame. The cover is formed in two parts 40a, 40b, and releasably secured together, the frame and cover being configured so as to allow the cover to be slid over the opening into the frame. Limited articulative movement is permitted between the two parts of the cover, which not only enables the cover to locate in the frame a "non-rock" manner, but also facilitates removal of the cover from the frame. When the cover is lifted by one of the keyways 46, the corner seats along line 69 tilt the cover and allow it to be slid linearly. Then one of the guide members 57 on the underside of the cover members comes into play by engaging the side of the frame and allowing the cover to be slid further as required.

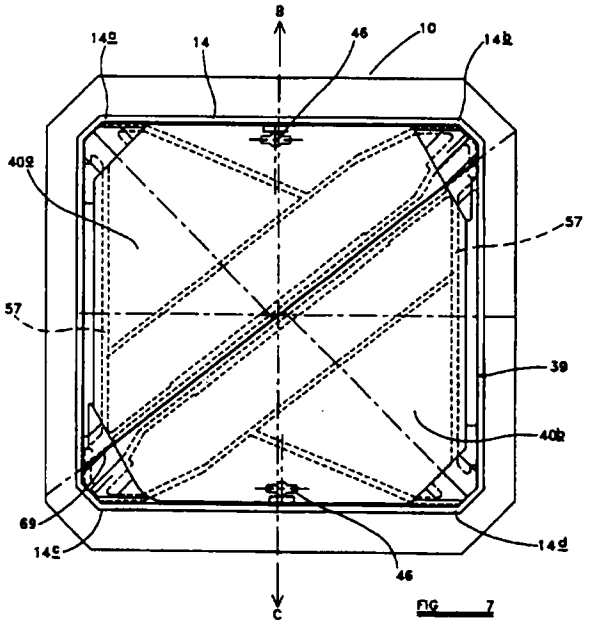

FIG 7

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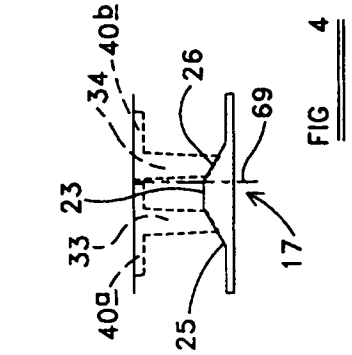


FIG 4

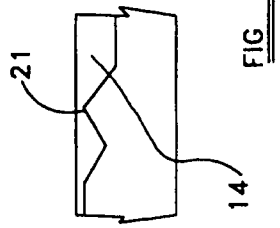


FIG 3

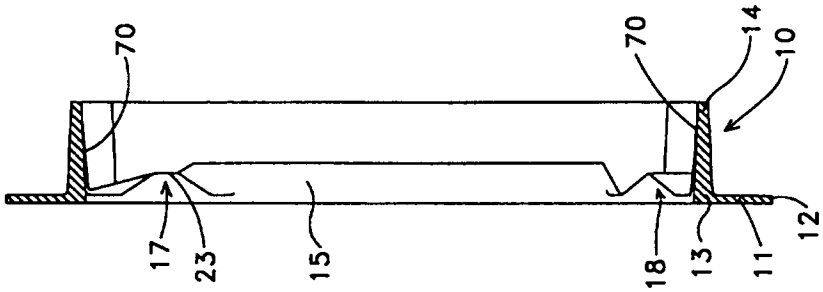


FIG 2

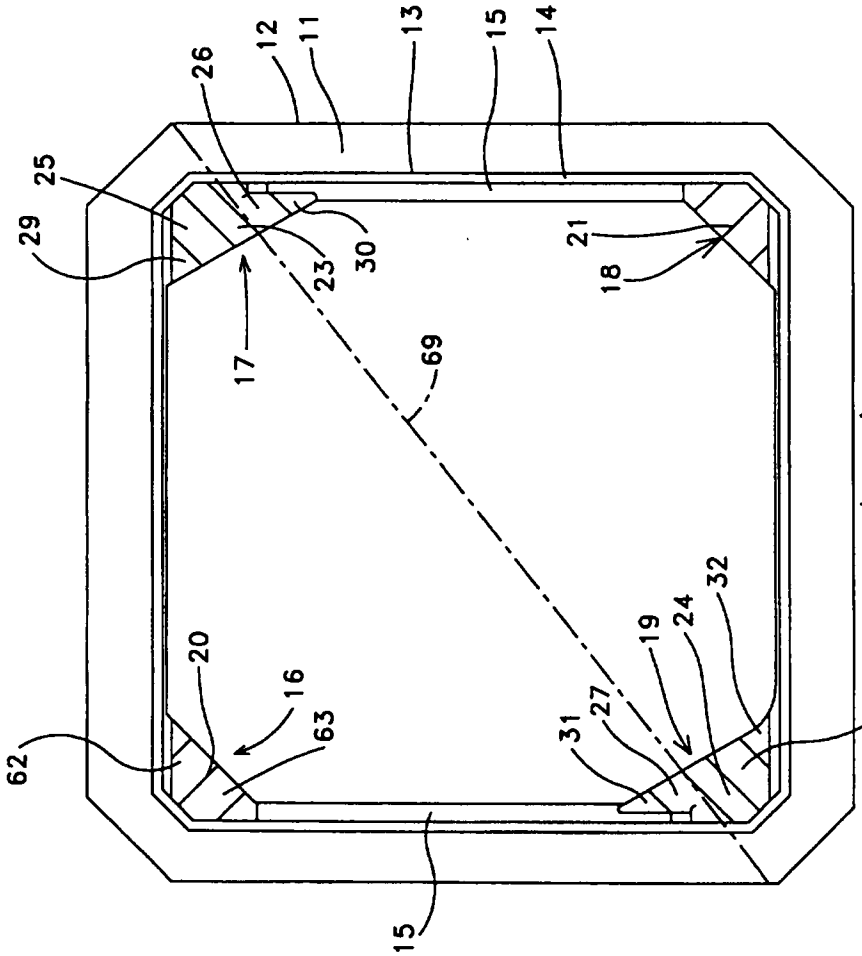


FIG 1

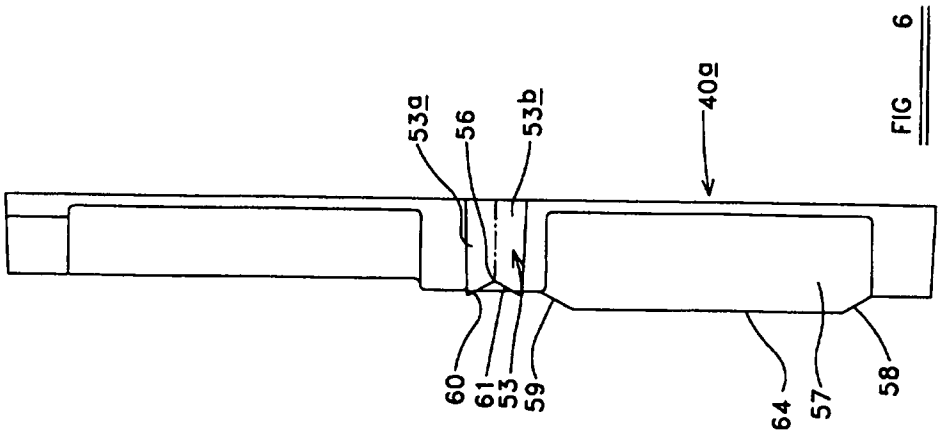

53a
56
53b
40a
60
61
53
59
64
57
58

FIG 6

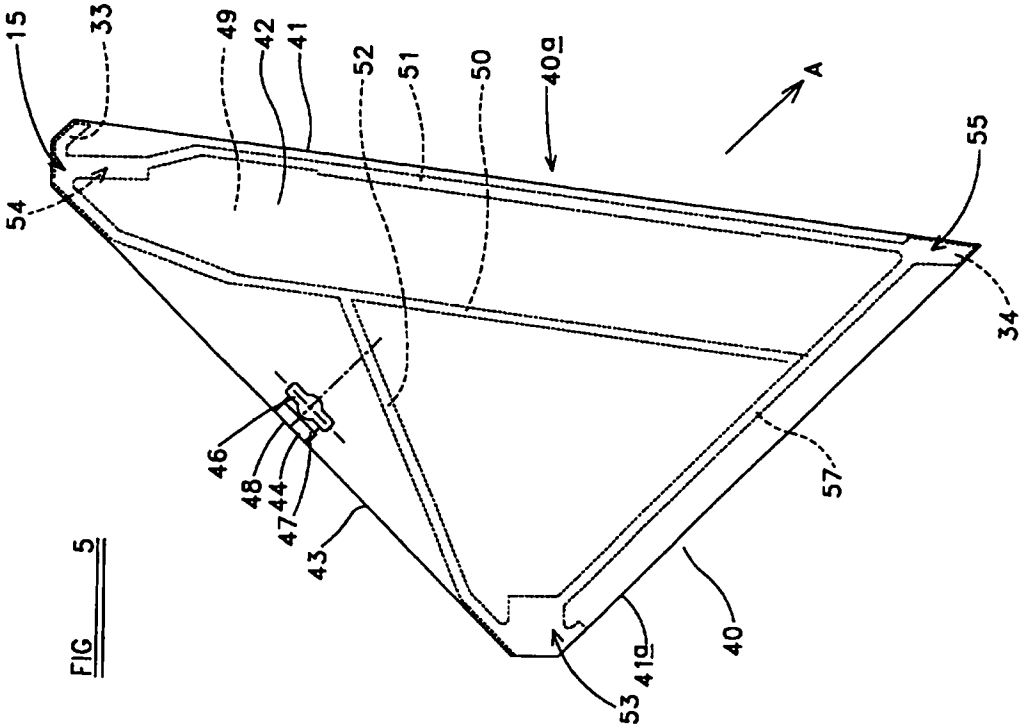

15
33
49
42
41
52
51
50
40a
A
55
54
34
46
48
44
47
43
57
40
41a
53

FIG 5

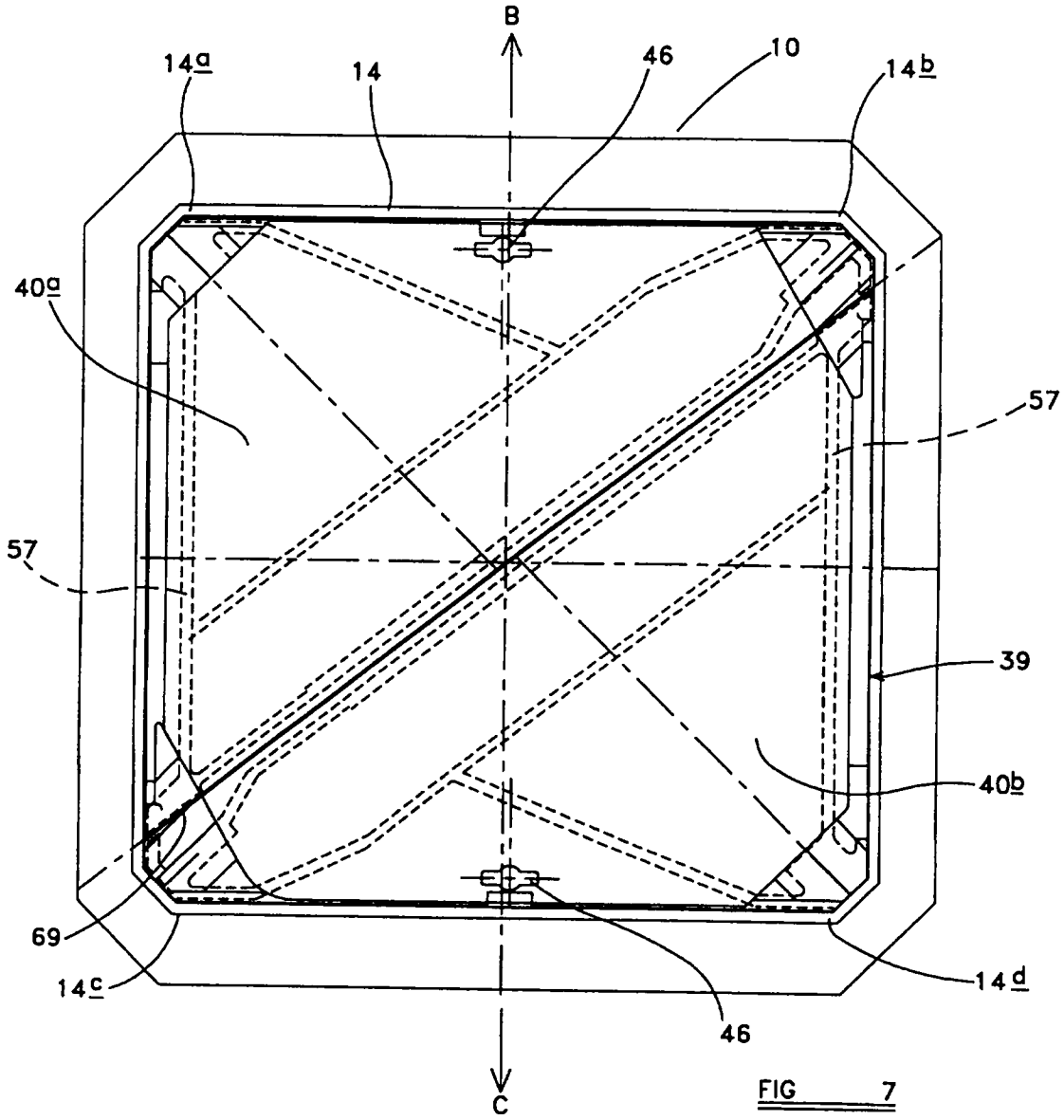


FIG 7

FIG 8a

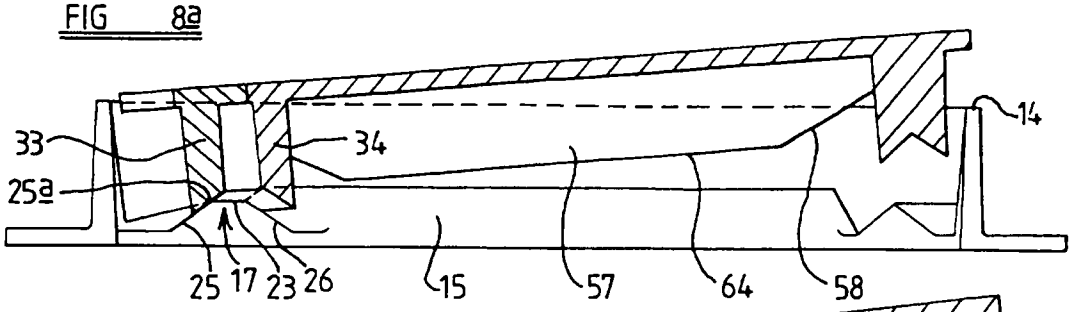
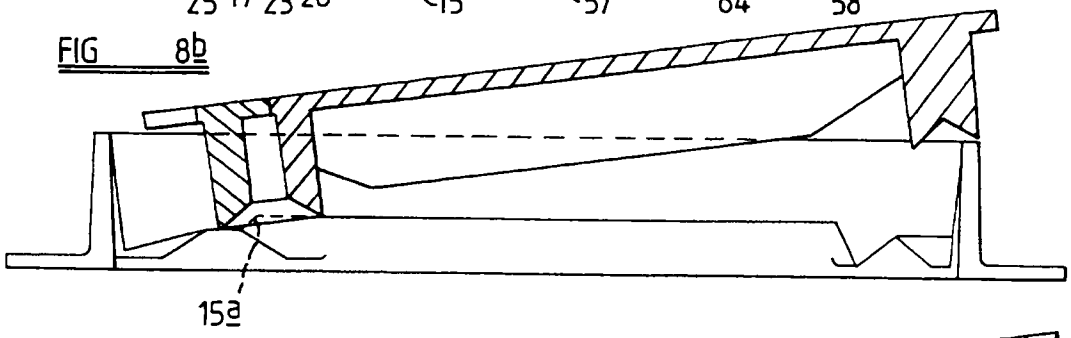


FIG 8b



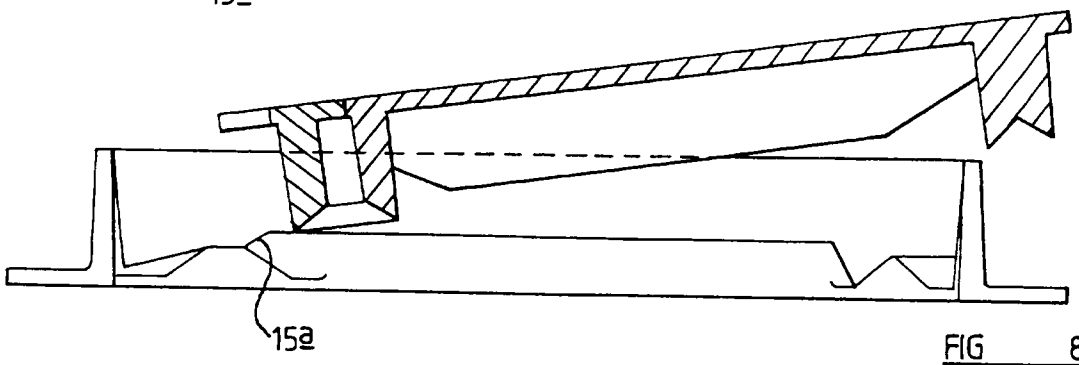


FIG 8c

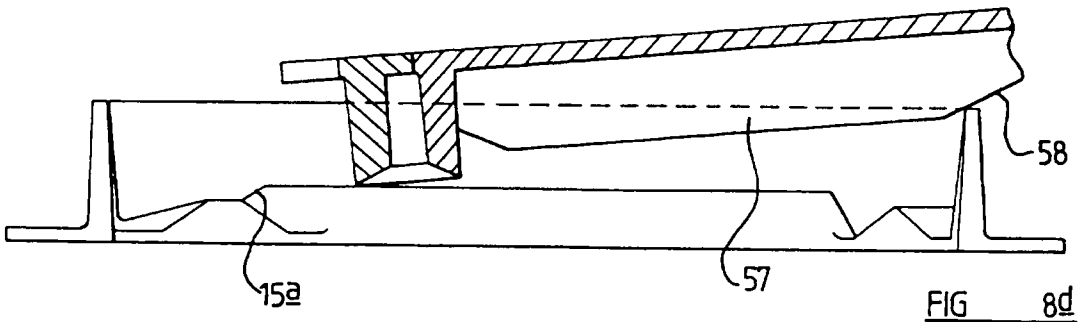


FIG 8d

PATENTS ACT 1977 **2315793**

WL/MNS/PP/A8886GB/MS1

Title: Cover and Frame Assembly

Description of Invention

This invention relates to a cover and frame assembly (hereinafter referred to as being of the kind specified) comprising a frame adapted to be received in the ground above an opening such as a manhole, ventilation shaft, sewer opening or the like, and a cover engageable with the frame to selectively prevent or allow access to the opening, the cover and frame being generally horizontally orientated when the frame is received in the ground.

As is conventional, the cover may have openings therein to allow water to drain into the opening below, as with a sewer grating, or it may be generally sealed such that drainage is prevented, as may be the case with a manhole or other access cover.

It is known to provide a cover which comprises two generally triangular parts releasably secured together in a manner in which limited articulative movement between the two parts is facilitated since this reduces the cover's tendency to rock in the frame when a load is applied to the cover from above. By use of two generally triangular parts, six seating areas may be provided (three on each part) by which the cover rests in the frame. It will be appreciated that depending on whether the cover is generally square or rectangular, isosceles or non-isosceles triangular parts may be utilised.

Various means may be used to hold the parts together, such as nut and bolt arrangements, or as is preferable, and as is shown in our co-pending U.K. patent application No. 9607904.1, a securing element retainable in an operative position by gravity.

Whilst such multi-part covers offer good resistance to rocking and distortion caused by generally downwardly depending loads from above, they often suffer from being extremely heavy such that it is difficult for one person to remove the cover from the frame by lifting the cover out of the frame.

There is described in GB2124683A a cover and frame assembly of the kind specified comprising a one piece cover, in which the frame is provided with

ramp means to enable the cover, on being lifted from the opening on one side, to be slid over the opening for removal therefrom. Heretofore however it has not proved practical to provide such a capability where the cover comprises two parts releasably secured together in a manner in which limited articulative movement between the two parts is facilitated.

According to one aspect of the invention, there is provided a cover and frame assembly of the kind specified, the cover comprising at least two parts secured together and being movable from a first, closed position, in which it extends over the opening, to a second, open position, in which at least part of the opening is uncovered, means being provided, on lifting one side of the cover from the opening, to permit each of the cover parts to be slid over the opening.

By "slidable" it will be understood that movement of the cover from the first towards the second position comprises translational movement generally in the plane of the cover, and thus generally parallel to the ground.

Preferably, the frame comprises ramp means at at least one corner thereof, conveniently at each corner thereof, and preferably each cover part comprises means to engage the ramp means to enable the rear of the cover (i.e. the side opposite to that which is lifted) to rise partially out of the opening as the lifted side is drawn, conveniently rectilinearly, away from the opening.

Preferably, the means on each cover part to engage the ramp means comprises an engagement formation at each corner thereof. In this manner, when one side of the cover is lifted, an engagement formation is present to engage with the ramp means at each corner of the rear of the cover.

Preferably, the engagement formations at the corner or corners of each cover part most distant from the other cover part comprise two engagement portions, whereas the engagement formations at the other two corners (in the preferred triangular cover part arrangement) comprise one engagement portion. In this way, with two cover parts secured together, two engagement portions are provided at each corner of the cover. It will be appreciated that since limited articulative movement is preferably permitted between the cover parts, where the

cover parts are triangular, each cover part effectively engages the frame at three points, each preferably corresponding to a ramp means on the frame, thus enabling a "non-rock" assembly to be obtained.

Preferably, each pair of engagement portions at each corner is arranged to facilitate movement of the rear of the cover, as the opposite side is lifted and drawn away from the opening.

The cover may be generally rectangular in plan view, and preferably is generally square. The cover preferably comprises similar parts, and whilst each part may have non-hypotenuse sides of equal length, the two non-hypotenuse sides are preferably of unequal length.

Accordingly, in a preferred assembly, when the two parts of the cover are placed adjacent one another, i.e. in a hypotenuse to hypotenuse manner, a generally rectangular, conveniently square, cover is provided, with a split line corresponding generally, but not exactly, to a diagonal thereof.

Preferably the angle of displacement of the split line from a true diagonal across the cover is between 5 and 15 degrees and conveniently is about 10 degrees.

The two parts may be connected together in any convenient manner but conveniently, they are provided with retaining formations adjacent the hypotenuse sides thereof, through which may pass a securing member, the securing member being retained in an operative position, in which transverse separative movement of the two parts is prevented, by gravity. Further details of such an arrangement may be found in our co-pending U.K. patent application No. 9607904.1.

Preferably, diagonally opposite pairs of engagement portions are similar or identical, whilst non-diagonally opposite pairs of engagement portions differ from one another in construction and configuration.

Thus, when the cover comprises two triangular cover parts, the cover as a whole comprises eight engagement portions on the underside thereof, four of these, being located at diagonally opposite corners of the cover corresponding

to the split line, being provided by two pairs of engagement portions, one engagement portion of each pair being associated with one cover part, the other of each pair being associated with the other cover part.

Furthermore, it will be appreciated that by virtue of the preferred unequal (offset) diagonal split, each receiving formation adjacent to the split line may comprise two unequal engagement portions.

Preferably, each pair of engagement portions provides, when the cover is in position on the frame, means to reduce or prevent rocking movement of the cover. Thus, the ramp means may be integral with locating formations provided on the frame.

Conveniently, there is provided one locating formation at or near each corner of the frame, and in a preferred arrangement, there may be provided four locating formations on the frame, each having ramp means associated therewith.

Preferably, diagonally opposed locating formations are similarly configured, such that in a generally rectangular cover and frame arrangement, two pairs of similar or identical locating formations are provided.

Conveniently, locating formations of a first pair are generally of inverted "V" shape, as disclosed in GB1588634, the apexes thereof lying on or close to a respective cover and frame diagonal, sloped sides thereof providing the ramp means at the respective corners.

Accordingly, there may be provided a corresponding first pair of inverted "V" shaped engagement formations on two diagonally opposed corners of the cover, each sloped side of the "V" being provided by one engagement portion.

A second pair of locating formations may be of similar configuration, but having the apex of each inverted "V" flattened to a generally planar configuration, such a flattened apex being henceforth referred to as the top portion.

Accordingly, there may be provided a corresponding second pair of engagement formations on the cover to engage with the second pair of locating

formations on the frame, each sloped side of the flattened inverted "V" again being provided by one engagement portion.

Preferably the first pair of engagement formations are provided at corners of the cover remote from the diagonal corresponding to the joint line.

Therefore, the second pair of engagement formations conveniently are provided at corners of the cover which are adjacent to or near the joint line.

As described above, each one of the second pair of engagement formations may comprise two engagement portions, one associated or integral with each respective part of the cover, each engagement portion projecting downwardly from the underside of each respective part of the cover, each portion thus providing a point of suspension for the cover relative to the frame.

In a preferred arrangement, limited separative, conveniently articulative movement may occur between the parts of the cover, and accordingly, such movement may also be permitted between the engagement portions adjacent to the joint line.

These engagement portions each conveniently have an abutment surface at a lower end thereof, which in use abuts or lies closely adjacent to sloped side edges of the second pair of locating formations. Since limited separative movement between these engagement portions is conveniently permitted by virtue of a non-rigid link between the parts of the cover, the engagement portions may be permitted to self-locate over the locating formation, enabling the cover to be securely located in the frame despite limited movement between the cover parts, and also to enable the associated part of the cover to rise partially out of the opening as described previously.

Such movement may also compensate for any distortion which may occur to the cover due to loads being applied thereto in use from above, and may also compensate for distortions arising through manufacturing tolerances.

Furthermore, the limited separative movement enables each cover part to maintain a 'three point' suspension, which would not be possible if the cover parts were rigidly secured together.

At least one, and preferably all, of the cover parts may comprise a guide member on the underside thereof, conveniently in the form of a generally elongate rib extending generally parallel to and located closely adjacent one of the shorter sides of the cover part. The guide member may have, at at least one end thereof, a sloped edge portion, such that the guide member reduces in depth towards the corner corresponding to that end.

The frame preferably comprises an outer side wall, conveniently continuously extending around a periphery thereof, which upstands generally perpendicularly from an outwardly projecting support flange which in use extends generally horizontally relative to the ground.

When the cover is in the first, closed position, the cover may lie within the outer side wall, with an upper periphery of the outer side wall lying generally in the plane of the upper surface of the cover, thus providing a pleasing visual appearance, and enabling the cover to locate flush with the ground.

The frame also preferably comprises at least one inner side wall, which may comprise an upstanding rib, of lesser height than the outer side wall. The or each inner side wall may be laterally spaced from the outer side wall, or may be integral therewith, such that the inner side wall may comprise an increased thickness portion of the outer side wall on an inwardly facing lower part thereof.

The or each inner side wall may be separate from the locating formations (and thus the ramp means) provided on the frame, but is preferably integral therewith.

In use, when the cover is in a first, closed position, a bottom edge of the or each guide member on the cover may lie closely adjacent an upper edge of the or each inner side wall.

The cover is preferably provided with at least one aperture therein adapted to receive a key or similar tool to enable the cover to be removed from the frame. The or each aperture, henceforth referred to as a keyway, may be located closely adjacent an edge of the cover, and conveniently, two keyways are

provided, adjacent opposed edges of the cover, at or near middle portions of each edge.

According to this invention there is also provided a cover and frame assembly of the kind specified, the cover comprising two parts secured together by means providing for limited articulative movement between the two parts, wherein each part is provided with a keyway to aid removal of the cover, characterised in that the keyway is on or adjacent to a rectilinear median of the cover along the direction of sliding movement.

Preferably, the keyway is adjacent a side edge thereof.

Of course, there may be provided more than one keyway, each adjacent a respective side edge as appropriate.

This enables the cover to be lifted and slid free in a direction parallel to one pair of side edges, as distinct from parallel to a diagonal thereof.

In this manner the tendency for the cover to "fold" about the diagonal during such movement is reduced, and in particular such movement facilitates sliding movement of the cover across the frame towards a fully opened position.

Preferably location means is provided between the cover and frame, to locate the cover relative to the frame and resist relative movement between the cover parts and the frame.

There may be provided beneath the keyway a chamber, adapted to prevent dirt or other foreign matter falling through the keyway into the opening below the cover and frame. The chamber may be sealed, by which it is meant that the keyway provides the only opening to the chamber, but preferably, the chamber is open at least one other side thereof, conveniently a generally vertical side, thus allowing access to the interior of the chamber other than through the keyway, to facilitate the removal of dirt or foreign matter therefrom.

Conveniently, the open side affords an opening in the chamber which faces towards the adjacent side wall of the cover, and desirably, the opening may be coplanar with the side wall.

There will now be given a detailed description of a preferred embodiment of the invention, which will now be described in greater detail by way of example only by reference to the accompanying drawings, wherein:

FIGURE 1 is a top plan view of a frame in accordance with the invention,

FIGURE 2 is a side sectional view of the frame of Figure 1,

FIGURE 3 is a schematic illustration of one locating formation, with ramp means of the frame of Figure 1,

FIGURE 4 is a schematic illustration of a further locating formation, with ramp means of the frame of Figure 1, in partial engagement with part of a cover,

FIGURE 5 is a plan, part sectional view of one part of the cover,

FIGURE 6 is a side view of the part of the cover showing Figure 5,

FIGURE 7 is a plan, schematic view of a complete cover and frame assembly, and

FIGURES 8a, 8b, 8c and 8d are schematic side views of the cover and frame in four stages of removal.

The preferred embodiment of this invention is a cover and frame assembly of the kind specified, comprising a rectangular frame 10 adapted to be received in the ground above an opening such as a manhole, and a cover 39 comprising two cover parts 40a, 40b engagable with the frame to selectively prevent or allow access to the opening. Means (not shown) is provided to secure the two cover parts 40a and 40b together, particularly in a manner in which limited relative movement, desirably articulative movement, between the cover parts is permitted, in known manner.

Referring first to Figure 1, the frame 10 comprises a generally planar support flange 11, having an outer periphery 12 and an inner periphery 13, an outer side wall 14 upstanding generally perpendicularly from the support flange 11, the outer side wall 14 extending continuously around the inner periphery 13. The frame further comprises two inner side walls 15, of lesser height than the

outer side wall 14, the inner side walls 15 being integral with the outer side wall 14 at a lower part thereof.

There are provided at corners of the frame locating formations comprising ramp means, generally indicated at 16, 17, 18 and 19 which are adapted to facilitate insertion and removal of a cover in and out of the frame, and to, receive a corresponding formation on the cover when the cover is received in the frame.

The locating formations 16 and 18 are of an inverted "V" shape, with apices 20 and 21 lying on or close to a diagonal of the frame 10.

The locating formations 17 and 19 are of a different configuration, having flattened apices, thus providing top portions 23 and 24, from which sloped side edges 25, 26 and 27, 28 extend away towards planar parts 29, 30 and 31, 32 respectively, the sloped side edges providing ramp means by which the cover may rise partially out of the frame as further described later.

Figure 3 shows a side view of one of the locating formations 16 and 18, the configuration being such that a correspondingly shaped engagement formation on an underside of the cover is seated securely on the inverted "V" configuration, thus impeding movement of the cover relative to the frame, the sloped side edges depending downwardly from the apex 21 providing further ramp means.

Referring to Figure 4, a locating formation such as that shown at 17 or 19 is shown, having a top portion 23 and sloped side edges 25 and 26 depending downwardly therefrom, against which engagement portions 33 and 34 of the cover 39 may abut.

Referring now to Figure 5, there is shown one part 40a of a cover adapted to engage with the frame 10 of Figure 1, the cover in use comprising two identical or similar parts 40a and 40b secured together along the longer side 41. Thus, whilst the following description relates to part 40a, it will be appreciated that similar considerations apply to part 40b.

The cover part 40a comprises an upper surface 42 and side edges the longer of which is shown at 41, the shorter of which being shown at 41a and 43 respectively. The side edge 43 is provided with an aperture in the form of a prising slot 44 to enable a tool or a lever to be inserted therein to permit loosening of the cover from the frame 10 when the cover occupies a first, closed position in relation to the frame, since the cover may after a time 'stick' in the frame due to ingress of dirt, tar, or other foreign matter. It will of course be understood that there may be provided more than one prising slot, if desired.

There is provided adjacent the side edge 43 a keyway 46 in the form of an aperture in the upper surface 42 of the cover part, which keyway comprises a chamber 47 at an underside of the cover part, being generally of box like configuration but having an open side 48 through which access to the chamber may be obtained to facilitate removal of dirt or foreign matter which may accumulate in the chamber by passing through the keyway 46.

There are provided on an underside 49 of the cover part 40a reinforcing ribs 50, 51 and 52, and it will be appreciated that the location of such ribs plays no part in the invention.

Also located on the underside 49 of the cover part 40a are engagement formations adapted to engage with the locating formations 16 to 19 on the frame, as indicated at 53, 54 and 55.

The engagement formation 53 is adapted to engage with locating formations 16 or 18, and accordingly has a correspondingly inverted "V" shaped configuration, with the apex 56 thereof lying on a diagonal (See Figure 6), and two engagement portions 53a and 53b integral with each other.

Conversely the engagement formations 54 and 55 are each provided in two separate parts, each comprising engagement portions 33 and 34, as shown in Figure 4, one of which is provided on the cover part 40a, the other of which is provided on the cover part 40b.

There is further provided on the underside of each cover part 40a a guide member 57, in the form of a downwardly extending rib, of greater depth

than the reinforcing ribs 50, 51 and 52, which when the cover is in a closed position, lies closely adjacent an upper part of inner side wall 15, as shown in Figures 1 and 2.

As can be seen from Figure 7, the cover 39 is divided into two parts 40a and 40b along a line 69 which, whilst being medial, does not pass symmetrically through the corners of the cover 39, but extends in such a manner that a greater proportion of a bearing area between the cover part 40a and the frame occurs on one side of the dividing line 69, whilst a greater proportion of the bearing area between the other part 40b of the cover and the frame occurs on the other side of the dividing line. In this manner, when force is applied to the cover to move the cover in the directions B or C, a greater surface area of the engagement and location formations will be engaged at the leading edge of the cover, and at the trailing edge of the cover, with consequent advantages of stability.

Referring now to Figure 6, the cover part 40a of Figure 5 is shown in side view, and it can be seen that the guide member 57 projects below the side walls 41, 41a and 43, there being provided sloped edge portions 58 and 59 at ends thereof. It can also be seen that the engagement formation 53 is of an inverted "V" shape, with sloped edges 60 and 61 of engagement portions 53a and 53b being adapted to cooperate with sloped edges 62 and 63, as shown in Figure 1. The configuration of the "V" is such that tendency is reduced for the cover part 40a to "ride up" over the apex 20 of the "V" formation on the frame, thus maintaining the cover in a fixed position relative to the frame.

As shown in Figure 4, and more clearly in Figures 8a, 8b, 8c, and 8d the engagement portions 33 and 34, when the cover is in a closed position, abut sloped side edges 25 and 26 of locating formation 17, but upon sliding movement of the cover in a direction generally indicated by arrow A in Figures 1 and 5, which of course follows an initial lifting movement which causes pivoting of the cover relative to the frame, generally about the point 25a between the sloped side edge 25 and the top portion 23, engagement portion 33 slides up the ramp means

provided by sloped side edge 25, (Figure 8a) until the engagement portion 33 engages top portion 23 of locating formation 17, (Figure 8b) whereupon upward movement of the cover ceases, but wherein sliding movement may continue. As the sliding movement continues, (Figure 8c) lower parts of the engagement portions 33 and 34 engage with the top surface of the inner wall 15, such engagement permitting the cover to continue to be slid out of the frame.

As further sliding movement occurs, (see Figure 8d) the sloped side edge 58 of the guide member 57, moves towards the upper periphery of the outer side wall 14, in the regions generally indicated at 14a, 14b, 14c and 14d (Figure 7) and upon contact therewith, the sloped edge 58 slides over the periphery of the outer side wall such that the cover at that point may slide relative to the frame by virtue solely of engagement of lower surface 64 of the guide member 57 with the upper part of outer side wall 14.

Since the area of contact between the cover and frame is thus minimised, frictional resistance to slidable movement is reduced, facilitating removal of the cover from the frame.

Referring finally to Figure 7, this shows the frame 10 provided with two cover parts 40a and 40b secured to each other, and located within the frame, and it can be seen that two keyways 46 are thus provided, such that slidable removal of the cover from the frame could be performed either in the direction shown by arrow B or in the direction shown by arrow C. It can be seen from Figure 7 that as sliding movement begins in either of such directions, the guide members 57 begin to approach the outer side wall 14 at positions indicated at 14a/14b or 14c/14d depending on the direction of slidable movement.

It will be appreciated that in order to commence such sliding movement, a degree of lifting will be required, and in order to facilitate such initial movement, the outer side wall 14 may have an inwardly tapered surface 70 (see Figure 2) such that on initial lifting of the cover at either of the key-ways 46, the cover may pivot about a pivot point corresponding to a lower part of receiving

portion 33, and the degree of taper of the tapered surface 70 determines to what extent such pivotal rotational movement is permitted.

It will be appreciated that whilst in the foregoing description, the cover and frame assembly has been described as having two inner side walls, the applicants envisage that four inner side walls may be provided, such that sliding movement in four directions may be permitted, in contrast to the two directions shown herein. Furthermore, it will be understood that the configuration of engagement and locating formations described herein may also be suitable for use with one-piece covers.

Further, the applicants envisage that a plurality of covers, each comprising at least two parts, may be provided in an enlarged frame, with each cover being slidable into and out of the frame.

Still further, it is envisaged that the ramp means may alternatively be provided on the cover parts, rather than on the frame, with the engagement formations thus being provided on the frame.

It may also be the case that the locating formations provided on the frame do not in fact comprise ramp means, and instead are generally horizontally orientated relative to the frame, thus providing a generally flat formation with which the cover may engage. In such a case, there may be provided ramp means or other suitable formations on the cover, to enable the cover to rise partially out of the opening as the lifted side is drawn away from the opening, in such a manner that the cover does not bind with the locating formation.

Thus, it may be that whilst initial pivotal movement of the cover relative to the frame is permitted upon initial lifting of one side of the cover, as hereinbefore described, relative vertical movement of the cover relative to the frame is obtained by engagement of the cover with a sloped end part 15a of the inner side wall 15, as shown in Figures 8a to 8d.

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process

for attaining the disclosed result, as appropriate, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS

1. A cover and frame assembly of the kind specified, the cover comprising two parts secured together and movable from a first, closed position, in which it extends over the opening, to a second, open position, in which at least part of the opening is uncovered, means being provided, on lifting one side of the cover from the opening, to permit each of the cover parts to be slid over the opening.

2. An assembly according to Claim 1 wherein the frame comprises ramp means at at least one corner thereof.

3. An assembly according to Claim 1 or Claim 2 wherein the frame comprises ramp means at each corner thereof.

4. An assembly according to Claim 2 or Claim 3 wherein each cover part comprises means adapted to engage the ramp means.

5. An assembly according to Claim 4 wherein the means adapted to engage the ramp means enables the rear of the cover (ie the side opposite to that which is lifted) to rise partially out of the opening as the lifted side is drawn, conveniently rectilinearly, away from the opening.

6. An assembly according to Claim 4 or Claim 5 wherein the means on each cover part adapted to engage the ramp means comprises an engagement formation at at least one corner thereof.

7. An assembly according to Claim 6 wherein the means on each cover part adapted to engage the ramp means comprises an engagement formation at each corner thereof.

8. An assembly according to Claim 6 or Claim 7 whereby when one side of the cover is lifted, an engagement formation engages with the ramp means at one or each corner of the rear of the cover.

9. An assembly according to any one of the preceding Claims wherein the cover parts are generally triangular in plan view.

10. An assembly according to Claim 9 wherein the engagement formation at the corner of each cover part, which corner is most distant from the other cover part, comprises two engagement portions.

11. An assembly according to Claim 10 wherein the engagement formations at the other two corners of each cover part comprise one engagement portion.

12. An assembly according to any one of Claims 9 to 11 wherein each cover part, when engaged with the frame, effectively engages the frame at three points.

13. An assembly according to any one of the preceding Claims wherein the cover is generally square in plan view.

14. An assembly according to any one of Claims 9 to 13 wherein the two non-hypotenuse sides of each cover part are of unequal length.

15. An assembly according to Claim 14 whereby when the cover has a split line defined by the cover parts which lies generally, but not exactly, on a true diagonal thereof.

16. An assembly according to Claim 15 wherein the angle of displacement of the split line from the true diagonal of the cover is between 5 and 15°.

17. An assembly according to any one of the preceding Claims wherein diagonally opposite pairs of engagement portions are similar or identical.

18. An assembly according to any one of the preceding Claims wherein non-diagonally opposite pairs of engagement portions differ from one another.

19. An assembly according to any one of Claims 9 to 18 wherein the cover comprises eight engagement portions on the underside thereof.

20. An assembly according to Claim 19 wherein four of the engagement portions, located at diagonally opposite corners of the cover adjacent the split line, are provided by two pairs of engagement portions, one engagement portion of each pair being associated with one cover part, the other engagement portion of each pair being associated with the other cover part.

21. An assembly according to any one of Claims 15 to 20 wherein each engagement formation adjacent the split line comprises two differently configured engagement portions.

22. An assembly according to Claim 20 or Claim 21 wherein each pair of engagement portions provides, when the cover is in engaged with the frame, means to reduce or prevent rocking movement of the cover.

23. An assembly according to Claim 22 wherein the ramp means are integral with locating formations provided on the frame.

24. An assembly according to Claim 23 wherein there is provided one locating formation at or near each corner of the frame.

25. An assembly according to Claim 23 or Claim 24 wherein there are provided four locating formations on the frame, each having ramp means associated therewith.

26. An assembly according to any one of Claims 23 to 25 wherein diagonally opposed locating formations are similarly configured, such that in a generally rectangular cover and frame arrangement, two pairs of similar locating formations are provided.

27. An assembly according to Claim 26 wherein a first pair of locating formations are generally of inverted "V" shape, the apices thereof lying on or close to a respective cover and frame diagonal, sloped sides thereof providing the ramp means at the respective corners.

28. An assembly according to Claim 27 wherein there is provided a corresponding first pair of inverted "V" shaped engagement formations on two diagonally opposed corners of the cover, each sloped side of the "V" being provided by one engagement portion.

29. An assembly according to any one of Claims 23 to 28 wherein there is provided a second pair of locating formations generally of inverted "V" shape, but having the apex of each inverted "V" flattened to a generally planar configuration.

30. An assembly according to Claim 29 wherein there is provided a corresponding second pair of engagement formations on two diagonally opposed corners of the cover to engage with the second pair of locating formations on the

frame, each sloped side of the flattened inverted "V" being provided by one engagement portion.

31. An assembly according to any one of Claims 28 to 30 wherein the first pair of engagement formations are provided at corners of the cover remote from the split line.

32. An assembly according to Claim 30 or Claim 31 wherein the second pair of engagement formations are provided at corners of the cover which are adjacent or near to the split line.

33. An assembly according to any one of the preceding Claims wherein limited separative, conveniently articulative, movement may occur between the cover parts.

34. An assembly according to any one of the preceding Claims wherein one of the cover parts comprises a guide member on the underside thereof, conveniently in the form of a generally elongate rib.

35. An assembly according to Claim 34 wherein the guide member has, at at least one end thereof, a sloped edge portion.

36. An assembly according to any one of the preceding Claims wherein the frame comprises an inner and outer side wall, wherein the inner wall comprises an upstanding rib of lesser height than the outer side wall.

37. An assembly according to Claim 36 wherein the inner side wall is integral with the locating formations provided on the frame.

38. An assembly according to Claim 36 or Claim 37 wherein when the cover is in a first, closed position, a bottom edge of the guide member on the cover lies closely adjacent an upper edge of the side wall.

39. An assembly according to any one of the preceding Claims wherein the cover is provided with a keyway therein adapted to receive a key or similar tool to enable the cover to be removed from the frame, the keyway being located closely adjacent an edge of the cover.

40. An assembly according to Claim 39 wherein two keyways are provided, adjacent opposed edges of the cover, at or near middle portions of each edge.

41. A cover and frame assembly of the kind specified, the cover comprising two parts secured together by means providing for limited articulated movement between the two parts, wherein each part is provided with a keyway to aid removal of the cover from the frame, by generally sliding movement, characterised in that the keyway is on or adjacent to a rectilinear median of the cover along the direction of sliding movement.

42. An assembly according to Claim 41 wherein the keyway is adjacent a side edge of the cover.

43. An assembly according to Claim 42 wherein the cover and frame are in accordance with any one of Claims 1 to 40.

44. A cover and frame assembly substantially as hereinbefore described and/or as shown in the accompanying drawings.

45. Any novel feature or novel combination of features described herein and/or in the accompanying drawings.

The Patent Office

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Application No: GB 9615727.6 **Examiner:** Robert L Williams
Claims searched: 1-40 and 44 **Date of search:** 22 May 1997

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Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): E1G

Int Cl (Ed.6): E02D 29/14

Other: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
A	GB 2,124,683 A	Brickhouse Dudley Manufacturing Limited	1
A	GB 0,336,437	W Needham	1

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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